Perceptual and Motor Skills, 1992, 75, 547-551. © Perceptual and Motor Skills 1992

LEFT EAR (RIGHT TEMPORAL LOBE) SUPPRESSIONS DURING DICHOTIC LISTENING, EGO-ALIEN INTRUSION EXPERIENCES AND SPIRITUALISTIC BELIEFS IN NORMAL WOMEN[1]

MARIELLE R. LAVALLÉE AND M. A. PERSINGER

Laurentian University

Summary.—Beliefs in spiritualism, a history of a sensed presence, and mental diplopia may share a common source of psychometric variance. We hypothesized that this variance should be specifically associated with right temporal-lobe function. Inferences of temporal lobe signs, hemisphericity (Vingiano's quotient) and self-esteem as well as dichotic listening measures were obtained for 26 university women. As predicted, the numbers of left-ear suppressions (right temporal-lobe function) but not of right-ear suppressions were specifically and moderately (*rho* = 0.64) correlated with the intensity of Tobacyk's spiritualistic beliefs and a history of sensed presences and ego-alien intrusions. However, the negative association (*rhos* about -0.45) between indices of left-right hemisphericity and self-esteem was related to a separate factor.

Belief that the self or soul can leave the body is a common component of religious dogma in many cultures (Persinger, 1987). Because beliefs are often reinforced by personal experiences, the persistence of this specific belief of a "detachment of consciousness" implies a fundamental property of brain function. Persinger and Makarec (1991, 1992, 1993) have hypothesized that the experiences of a sensed presence, such as a Spiritual Being, Cosmic Consciousness, Old Hag, and the feeling of "two selves," such as out-of-body experiences or astral traveling, are associated with the right hemispheric homologue ("equivalent") of the left hemispheric (and highly linguistic) sense of self. Intermittent intrusions of this right hemispheric process into the left hemisphere would be associated with the "awareness" of the "other self" (Persinger & Makarec, 1991; Persinger & Richards, 1991) and should promote individual and cultural variants of spiritualistic beliefs (but not necessarily all beliefs).

If this general concept is valid, then beliefs that emphasize spiritual concepts should be associated more strongly with indices of right temporal-lobe function rather than left temporal-lobe function. The process would be analogous to the pattern that is associated with complex partial epilepsy (Persinger & Makarec, 1987, 1993). During resting periods, the area involved should be associated with hypometabolism and hence mild deficits; during the seizure-like (paroxysmal) condition, hypermetabolism, enhanced function, and interhemispheric generalization should occur. This model predicts that

[1]Please send reprint requests to Dr. M. A. Persinger, Behavioral Neuroscience Laboratory, Laurentian University, Sudbury, Ontario, Canada P3E 2C6.

people who endorse spiritual beliefs should be prone to more intrusions (associated with brief periods of hypermetabolism) than those who do not endorse these beliefs. Most of the time, however, these people should display a relative inefficiency of right temporal-lobe function.

To test this hypothesis, 26 (24 right-handed, 2 left-handed, as defined by writing and eating preference) first-year university women (ages 18 to 53 years; $M = 25$) served as subjects; they received a 2-point bonus for participation. Each subject was tested singly in a quiet laboratory. She was given 20 (monaural) test words and the 60 pairs of dichotic (binaural) presentations from the Auditec tape that had been prepared by R. J. Roberts[2]; the words and procedures were similar to the classic Damasio tape (e.g., Springer, Garvey, Varney, & Roberts, 1991). The subject then completed J. Tobacyk's Revised Paranormal Belief Scale (e.g., Persinger & Richards, 1991). The numbers of suppressions for the left ear only, right ear only, and both ears were calculated; their means and standard deviations (in parentheses) were 7.6 (4.2), 6.8 (4.0), and 2.2 (1.7); there was no significant difference between the numbers of errors for the left and right ears ($t = 1.14$, $p > 0.05$). Each of the seven subscale scores and the total score on Tobacyk's scale were calculated. The mean and *SD* for the total scale were 90.2 (26.1); the subtest scores were not significantly different from those of previous samples (Persinger & Richards, 1991).

Approximately two months before the testing each subject had also received, in the class setting, the Personal Philosophy Inventory (Persinger & Makarec, 1987, 1993), the Coopersmith Self-esteem Inventory, and Vingiano's Hemispheric Questionnaire (1989) [mean .67 (*SD* .18)]. For the Personal Philosophy Inventory, the complex partial epileptic-like signs (Persinger & Makarec, 1987) cluster [*n* 35 (17)%] and the major temporal-lobe signs (Makarec & Persinger, 1990) cluster [*n* 37 (14)%] were calculated for comparison with the observation by Roberts' group (Springer, *et al.*, 1991) of a positive correlation between dichotic listening errors and complex partial epileptic-like signs. For the specific test of the present hypothesis, the three major factors (Persinger & Makarec, 1993) were Factor I (sensory enhancement) 38 (22)%, Factor II (affective "right hemispheric") 68 (19)%, and Factor III (ego-alien intrusion) 13 (15)%. A specific cluster of items, called "sensed presence" was also calculated [18 (22)%]; it was specifically elevated in and discriminant for a group of psychics who encouraged dissociation and the putative "entry" of other cognitive processes (Persinger & Fisher, 1990). For this analysis only the general self-concept measure [34.6 (10.9)] was utilized. All analyses involved SPSS^X software on a VAX 4000 computer.

[2]Thanks to Auditec and to Dr. R. J. Roberts, Psychology Service (116-B), VA Medical Center, Iowa City, IA 52246.

The more conservative Spearman correlations (*rho* values $>.45$, $p<0.01$) were completed first between the psychometric measures. The correlations between Vingiano's Hemispheric Quotient and the three factors of the Personal Philosophy Inventory were .24 (ns), .45 ($p=0.01$), and -.04 (ns); the significant association between our right-hemispheric cluster (Factor II: affective) and Vingiano's measure has been noted previously (Richards & Persinger, 1991). Self-esteem was significantly and negatively correlated only with Factor II (-.54) and Vingiano's quotient (-.47); the general temporal-lobe signs cluster (-.46) but not the control cluster (-.01) was also correlated with self-esteem. The coefficients between Tobacyk's Spiritualism Scale [3.1 (1.3)] and these measures were Vingiano's quotient (-.02), sensory enhancement Factor I (.29), affective ("right hemispheric") factor (.52), ego-alien (ego-dystonic) intrusion factor (.38), and self-esteem (.20). [The only subscale to be correlated with self-esteem was traditional religious beliefs: .50; this scale had the only significant correlation with the Hemispheric Quotient (-.38), indicating greater left hemisphericity is associated with stronger traditional religious beliefs.]

Correlations between the dichotic listening scores and the psychometric measures showed a clear pattern. As hypothesized, subjects who displayed

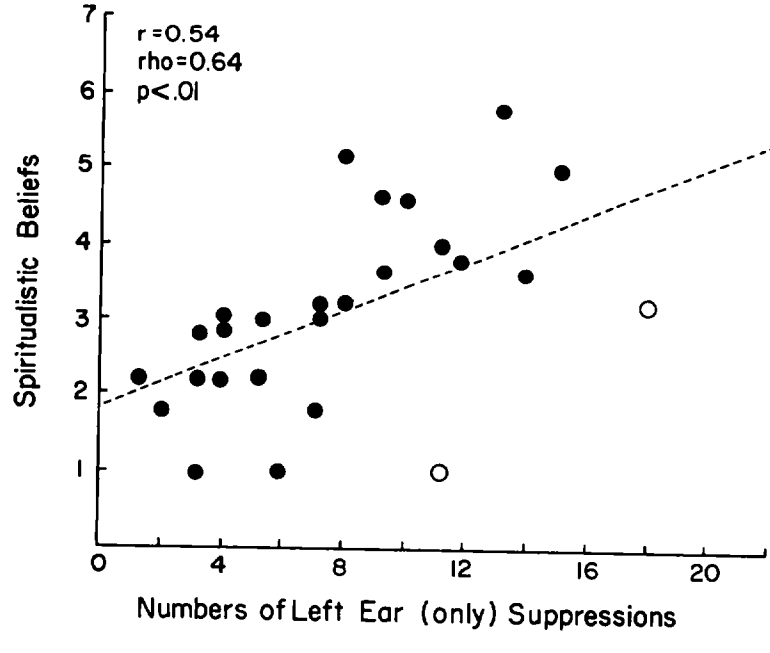

FIG. 1. Intensity of spiritualistic beliefs (1 to 7 scale) and the numbers of left ear (only) suppressions during a dichotic listening (60 pairs) task

more left-ear suppressions endorsed stronger spiritualistic beliefs (*rho* = .64, see Fig. 1), experiences of a sensed presence (.46), and higher scores on the ego-alien intrusion factor (.51). Whereas numbers of right-ear (.45) and both-ear suppressions (.47) were correlated with spiritualism, these measures were not correlated significantly with either the sensed presence (.36; .09) or ego-alien intrusion scores (.05; .07). As shown by Springer, *et al.* (1991) who employed this tape but different indices of complex-partial epileptic-like signs, the numbers of left (.37) and right (.36) suppressions were mildly correlated with complex partial epileptic-like signs. However, neither the self-esteem scores nor the Hemispheric Quotients were significantly correlated with any of the dichotic listening measures.

To discern the unique contribution of the left-ear suppressions (right temporal-lobe function) to the psychometric measures, partial correlation analyses were completed. When the errors for the right ears were held constant, the partial correlations between the left-ear suppressions and the measures were obtained for spiritualism (.41, $p<0.05$), ego-alien intrusion (.54, $p<0.01$), and sensed presence (.53, $p<0.01$). When the numbers of left suppressions were held constant, the partial correlations between the numbers of right-ear suppressions and the three questionnaire scales were not significant (all coefficients $>-.10$; $<.10$). The partial correlation between left-ear suppressions and spiritualism was .61 when the sensed-presence score was held constant while the correlation between this dichotic measure and the sensed presence was .51 when spiritualism was held constant. These results supported the specific association between right temporal-lobe processing and beliefs in spiritualism and a history of a sensed presence or ego-alien intrusion.

Factor analysis by the principal component procedure was performed with the most recurrent (interdependent) variables: sensory-enhancement, affective, ego-alien intrusion, Hemispheric Quotient, self-esteem, spiritualism, and left-ear suppressions; two factors emerged. After varimax rotation, Factor 1 (eigenvalue = 3.11; 45% variance) was loaded significantly by our sensory enhancement (.55), affective (right) hemispheric factor (.56), ego-alien intrusion (.73), left-ear suppressions (.83), and spiritualism (.80). The second factor (eigenvalue = 1.45, 20%) was loaded predominantly by the affective factor (.62), Vingiano's Hemisphericity Quotient (.83), and by self-esteem (−.76); the latter factor structure has been reported previously (Persinger & Makarec, 1991, 1993).

These results further support the hypothesis that people with a greater range in electrical and metabolic activity within the right temporal lobe are more prone to periodic intrusions of the right-hemispheric homologue of the sense of self (Persinger & Makarec, 1992). These experiences are reported as a "detached self," cosmic consciousness, or a sensed presence; their interpre-

tations involve left-hemispheric processes that are influenced by religious beliefs and reinforcement history (Persinger, 1987). The specific factor loadings and pattern of correlation with the dichotic-listening scores indicate that spiritualistic beliefs (sample items: soul leaving body, communication with the dead, reincarnation) and a history of "sensed presence" are related to efficiency of right temporal-lobe auditory processing.

On the other hand, the intercorrelations among low self-esteem, elevated right hemisphericity, and the "affective" factor from the Personal Philosophy Inventory are related to a separate source of shared variance. Such distinction from the "sensed presence" cluster would not appear to support the hypothesis that low self-esteem would be associated with right-hemispheric dominance (Persinger & Makarec, 1991). However, other studies (Munro & Persinger, 1992) have shown that episodes of fear and right hemisphericity are associated with enhanced theta activity over the region (T4) that corresponds to the mid-temporal lobes. Whether or not people with histories of mild dyslexia, low self-esteem, and high right hemisphericity are also prone to a frequent sensed presence of "another" (Persinger & Makarec, 1991) must still be examined.

REFERENCES

MAKAREC, K., & PERSINGER, M. A. Electroencephalographic validation of a temporal lobe signs inventory in a normal population. *Journal of Research in Personality*, 1990, 24, 323-337.

MUNRO, C., & PERSINGER, M. A. Relative right temporal lobe theta activity correlates with Vingiano's Hemispheric Quotient and the "sensed presence." *Perceptual and Motor Skills* (submitted).

PERSINGER, M. A. *Neuropsychological bases of god beliefs*. New York: Praeger, 1987.

PERSINGER, M. A., & FISHER, S. D. Elevated, specific temporal lobe signs in a population engaged in psychic studies. *Perceptual and Motor Skills*, 1990, 71, 817-818.

PERSINGER, M. A., & MAKAREC, K. Temporal lobe epileptic signs and correlative behaviors displayed by normal populations. *The Journal of General Psychology*, 1987, 114, 179-195.

PERSINGER, M. A., & MAKAREC, K. Greater right hemisphericity is associated with lower self-esteem in adults. *Perceptual and Motor Skills*, 1991, 73, 1244-1246.

PERSINGER, M. A., & MAKAREC, K. The feeling of a presence and verbal meaningfulness in context of temporal lobe function: factor analytic verification of the Muses? *Brain and Cognition*, 1992, in press.

PERSINGER, M. A., & MAKAREC, K. Complex partial epileptic-like signs as a continuum from normals to epileptics: normative data and clinical populations. *Journal of Clinical Psychology*, 1993, in press.

PERSINGER, M. A., & RICHARDS, P. Tobacyk's Paranormal Belief Scale and temporal lobe signs: sex differences in the experiences of ego-alien intrusions. *Perceptual and Motor Skills*, 1991, 73, 1151-1156.

RICHARDS, P., & PERSINGER, M. A. Temporal lobe signs, the Dissociative Experiences Scale and the Hemispheric Quotient. *Perceptual and Motor Skills*, 1991, 72, 1139-1142.

ROBERTS, R. J., VARNEY, N. R., PAULSEN, J. S., & RICHARDSON, E. D. Dichotic listening and complex seizures. *Journal of Clinical and Experimental Neuropsychology*, 1990, 12, 448-458.

SPRINGER, J. A., GARVEY, M. J., VARNEY, N. R., & ROBERTS, R. J. Dichotic listening failure in dysphoric neuropsychiatric patients who endorse multiple seizure-like symptoms. *Journal of Nervous and Mental Diseases*, 1991, 179, 459-467.

VINGIANO, W. Hemisphericity and personality. *International Journal of Neuroscience*, 1989, 44, 263-274.

Accepted July 20, 1992.